ART. VIII. — 1. *Observations on the Euphrates Line of Communication with India.* By COLONEL CHESNEY, R. A., D. C. L., F. R. S. Report of the British Association for the Advancement of Science. 1852.

2. *The Dead Sea a New Route to India.* By CAPTAIN WILLIAM ALLEN, R. N., F. R. S. London. 1855.

3. *Canalization de l'Isthme de Suez.* Exposé de M. FERD. DE LESSEPS. Nouvelles Annales des Voyages. Paris. September, 1855.

THE fifteenth century was just closing when the bold mariners of Portugal doubled the Cape of Good Hope, and discovered an oceanic route to India. The Turks had then recently become a power in Europe, and it was mainly to avoid their depredations upon the lucrative commerce of the East, that these adventurers braved the perils of the open sea. To shun the pirate Turk, Western Europe sought to reach India by circumnavigating Africa. Now, in the middle of the nineteenth century, Western Europe upholds the tottering empire of the Ottomans, that through their agency her commerce may enjoy a readier and a safer transit to and from the Indies. The Turk no longer formidable, the Arab no longer feared, is henceforth to guard the communication of England and France with the Persian Gulf, and to be the common carrier between Western Europe and Central and Southern Asia; and in the great cycle of history, commerce reverts to its ancient channels, the Euphrates and the Red Sea again become familiar names, and the discovery of Vasco de Gama recedes into the Dark Ages.

From the earliest periods of commercial enterprise in Europe, the attention of geographers and of merchants has been turned to the East Indies as their *Ultima Thule*, and the problem of successive ages has been to facilitate the commerce of the Indies with the West. The fabulous wealth of India allured Alexander to his almost fabulous march, by a circuit of more than nine thousand miles, from Tyre to the Hyphasis,*

* The modern *Sutledge*, in the Punjaub.

and his fleet under Nearchus, coasting from the mouth of the Indus to that of the Euphrates, was the first to acquaint the Western nations with the connection of the Persian Gulf with the Indian Ocean. We may imagine Pliny to have read to a select circle of friends the twenty-third chapter of the sixth book of his Natural History, with something of the enthusiasm with which we now contemplate projects that would lessen by one half the voyage from England to India. Contrasting his own age with that of Alexander, Pliny boasts that in his day voyages were made to India every year. Yet such were the perils of commerce, that companies of archers were carried on board the vessels to guard against the pirates who infested the Indian Seas.* These fleets sailed from Cape Ras-el-Bad, the most easterly peninsula of Arabia, at which point they connected with the overland caravans from the West. They made the nearest port of India, and, taking advantage of the periodical winds, returned to Arabia the same year. After enumerating the various routes of these yearly fleets, — some coastwise, others directly across the gulf, — Pliny communicates to his readers the latest authentic information concerning the route to India by way of Egypt and the Red Sea. "It will not be amiss," he says, "on the present occasion, to set forth the whole of the route from Egypt, which has been stated to us of late, upon information on which reliance may be placed, and is here published for the first time. [How much this reads like a confidential advertisement of 'Nicaragua' or 'Panama'!] The subject is one well worthy of our notice, seeing that in no year does India drain our empire of less than fifty millions of sesterces [$1,600,000], giving back her own wares in exchange, which are sold among us at fully one hundred times their prime cost." †

Our geographer then points out upon the map the route

* "Quippe omnibus annis navigatur, sagittariorum cohortibus impositis. Etenim piratæ maxime infestabant." Mr. Riley, whose free but elegant translation we occasionally follow, makes this the twenty-sixth chapter; but our folio edition, Basileæ, MDXLIX., has it the twenty-third.

† "Nec pigebit totum cursum ab Ægypto exponere, nunc primum certa notitia patescente. Digna res, nullo anno imperii nostri minus H S quingenties exhauriente India, et merces remittente quæ apud nos centuplicato veneant."

from Italy to India as follows. "From Italy to Alexandria; thence to Coptos, 310 miles up the Nile, — a voyage of twelve days, when the Etesian winds are blowing." From Coptos to Berenice, a harbor on the Red Sea, distant 257 miles, the journey is performed with camels in twelve days. Stations are arranged at intervals along the route for the supply of fresh water, and large caravansaries are erected that afford lodgings to travellers. On account of the extreme heat, the greater part of the distance from Coptos to Berenice is travelled by night, the day being spent at the stations. "From Berenice a voyage of thirty days, if the wind is favorable, brings the traveller to the southern coast of Arabia, in some of whose ports may be found vessels bound for India. Forty days more will carry him to the nearest port of India, if the wind called Hippalus or Favonius — the west wind — happens to be blowing. If travellers observe the periodical changes of the wind in those seas, they can go and return from Egypt to India in the same year. They set sail from India with a southeast wind,* and upon entering the Red Sea catch the southwest or south." †

Such, for substance, is the new route to India described by Pliny, upon the latest authentic information, in the year 77 of our era. The minuteness of his description, both as to the route, and as to the commercial facilities of its different points, is an index of the interest then felt in bringing the commerce of the East nearer to Southern and Western Europe. The most expeditious route then consumed about one hundred days in the journey from Alexandria to the nearest mart of India, and required four transshipments; one at Alexandria to the Nile boats; another from boats to camels at Coptos; a third from camels to vessels at Berenice; and a fourth at Ocelis or Cane, from Arabian to Indian bottoms. The traveller must watch the rising of the dog-star, and study the changes of the winds; and must pursue his voyage in peril of pirates, and of sea-serpents which were said to be twenty cubits in length. He was fortunate if he could go and return within a year. Now, Berenice is a heap of ruins; Coptos is the poor Mohammedan town of Kobt, ‡ built of the ruins of the mart

* *Vento vulturno.* † *Africo vel austro.*

‡ *Kobt, Koft,* or *Qeft,* is clearly identified as the ancient Coptos. One sees there at

of the Pharaohs and the Cæsars; and the navigation of the Nile above Cairo is limited to the domestic trade of Egypt. Yet Egypt seems destined again to form an important link in the shortest and most available route from Europe to the Indies.

Three projects are now prominent before the governments and the commercial bureaux of Western Europe, for opening a more direct route to the East India trade. The first is that proposed by Colonel Chesney, of the British army, in his splendid volumes published six years ago,* and also in a memoir submitted by him in 1852 to the British Association for the Advancement of Science,† — the project of a railway from the Bay of *Antioch* on the Mediterranean to *Bir* on the Euphrates, from which point small steamers could convey the mails and passengers to *Bassorah* or *Basra*, near the mouth of the river, within thirty-six hours of Bombay. This was a frequent route of Eastern trade in the time of Elizabeth. The "great queen," having by patents of monopoly chartered, in 1585, the Levant Company to trade to Babylon,‡ and again, in 1599, the "Governor and Company of Merchants trading to the East Indies,"‖ also maintained a fleet of boats at Bir to foster and protect English trade in Mesopotamia. There was then, as now, an overland route to India. And yet, remarks Macaulay, "it is curious and interesting to consider how little the two countries, destined to be one day so closely connected, were then known to each other. The most enlightened Englishmen looked on India with ignorant admiration. The most enlightened natives of India were scarcely

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this day some traces of the old wall, fragments of ancient pillars wrought into modern buildings, ruins of temples peering above the rubbish, and marks of the canals that once brought commerce to its gates, and irrigated its soil. The modern town is surrounded with cultivable land, and has a tolerably good bazaar. But filth and wretchedness are its prevailing characteristics.

* Expedition for the Survey of the Rivers Euphrates and Tigris, by Lieutenant-Colonel Chesney, R. A. Published by Authority. London: Longman, Brown, Green, & Longmans. 1850. Two volumes, royal octavo, with five plates and maps.

† Report for 1852.

‡ Sir Edward Osborne, Lord Mayor of London, was Governor of this Company. See Charter, in Chesney, Vol. II. p. 590.

‖ The Earl of Cumberland and two hundred and fifteen knights, aldermen, and merchants.

aware that England existed."* Little did Elizabeth, when thus disposing of the trade of India to the Earl of Cumberland, dream that a power from Leadenhall would rule the Ganges; or that the "colossal wooden seaman" that surmounted the first India House would become the symbol of a greater empire than her own. Yet the sagacious enterprise of Elizabeth organized a commerce that is now the wealth and glory of England.

The route by the Euphrates, which in her reign was "the high road to India," has ever since been in occasional use by the British government. Colonel Chesney reminds us that, up to the peace of 1815, the regular postal transit between England and the Indies was by way of Arabia and Asia Minor; the whole distance from London to Bassorah having been accomplished by fleet messengers in about thirty days, and thence by fast-sailing schooners to Bombay in twelve days more. As far back as the year 1829, Colonel Chesney travelled extensively in Asia Minor, Arabia, and Persia, with a view to ascertain the most feasible line of communication with India. This exploration, which he performed alone, through many obstacles, and sometimes at the hazard of his life, occupied more than three years, and enabled him to report to his government, from personal observation, a plan for steam communication with India by way of the Persian Gulf. The interest awakened by this report led to an appropriation by the House of Commons of £ 20,000 for an exploring expedition to the Euphrates and Tigris. Two flat-bottomed iron steamers, and "a competent staff of scientific and other officers, together with detachments of artillery and sappers," were placed under the command of Colonel Chesney, in the spring of 1835. Various untoward circumstances delayed the expedition at the mouth of the Orontes, where the party disembarked; but at length the steamers and their equipments, divided into sections, were safely transported by bullocks to the Euphrates, a distance of 147 miles. There the boats were launched without accident, and though the funds of the expedition were by this time exhausted, the dauntless Colonel began at his own cost the survey of the river. For a few days

* History of England, Vol. IV. p. 117, Harper's edition.

all proceeded well; but about midway from Bir to Bassorah a terrific simoom swept over them, and in an instant destroyed their labors and their hopes. The narrative of this calamity we will give in Colonel Chesney's own graphic language.

"Our operations were peaceably and successfully carried on, till, one portentous morning, we discovered a cloud like a man's hand, coming towards us with fatal speed. All efforts were made to secure the vessels in time, and the lesser one, the Tigris, even reached the bank; but the whirlwind of the desert had reached her at the same instant, and though still in its infancy, such was its violence that that unfortunate vessel recoiled from the bank, and was held as if in a vice, heeling over. The storm soon attained its greatest power. The Euphrates was backed at this moment to avoid a collision with the unfortunate Tigris, and at 1 P. M. we floated past as a mere log, in the midst of darkness deeper than that of night, immense waves breaking over and into the ill-fated vessel, till she was carried to the bottom in seven fathoms water, the helmsman and all others remaining firmly at their posts. So fearful and so violent had been the effects of this whirlwind from the desert, which would have blown a frigate out of the water, that portions of the paddle-boxes were in the fields before I and seven others reached the shore. Twenty of my brave companions had scarcely found a watery grave when a calm succeeded the hurricane, which had its whole course in fifteen minutes. Had it lasted eight or ten minutes more, the Euphrates, though secured to the bank with chain-cables and large jumpers driven into the earth, must have gone to the bottom also. The Arabs, however, showed the greatest kindness; for instead of taking advantage of our condition, as is unhappily frequently the case in our more civilized country, they gave us every possible assistance, by collecting the remains of goods, &c. Our loss, however, was very, very great; 1,100 drawings, and all the accounts of the expedition, all the money, with a large quantity of stores, &c., went to the bottom.

"This catastrophe happened at Werdí, about half-way between the Mediterranean and Persian Gulf, or nearly 500 miles from either; at the very spot where I first came upon the river, and also near the place where the apostate Julian lost the greater part of his fleet from a similar storm. The Arabs told us they had often witnessed storms, but never one such as this had been.

"I had been saved, and therefore I could not despair, though half the river still remained to be navigated. I had now the painful task of communicating what I had hitherto concealed from the officers and

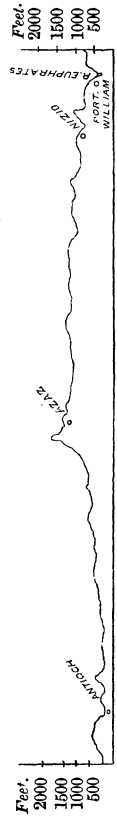
men, the orders to break up the expedition as soon as it should reach the Persian Gulf. I announced that I considered the late calamity would justify a departure from these orders; and being nobly seconded by the officers, who gave up their pay to lessen the expenses, we happily continued our survey and descent by Babylon to Bassorah, where we fired seventy-two guns, one for every year of our warm-hearted monarch, King William."

The failure of this great and costly expedition through a succession of disasters against which no human foresight could have provided, while it did not dishearten the projector and leader of the enterprise, nor disparage his sagacity in the view of intelligent persons, yet made upon the British government an impression disastrous to further schemes for an Asiatic route to India. A few spasmodic efforts of the East India Company to navigate the rivers of Mesopotamia, and a recent experiment of the Turkish government for the same object, are thus far the only practical results of Colonel Chesney's explorations. But the growing importance of the commerce of India to Great Britain, and the commercial value of *time* in the transportation of products, together with the lively personal interest of England in "the Eastern question," have turned the attention of capitalists toward the scheme of Colonel Chesney, as offering a lucrative investment for the conquests of peace in Asia, by way of offset to the burdens of war. The proposition is now seriously entertained of connecting the Mediterranean with the Euphrates by a railroad from the Bay of Antioch to Bir, a distance of 140 miles.

Concerning this project, Captain William Allen of the British navy remarks, that "the best and most obvious natural highway between Europe and the interior of Asia — that is, where there are the least obstructions — is through the lower valley of the Orontes and by Aleppo; the basin of which is separated from that of the Euphrates and Tigris — the vast plains of Mesopotamia — by hills of very moderate elevation, such as could be easily surmounted even by a railroad."* A bee-line of levels from Antioch to Bir finds its highest elevation at Azaz, 1500 feet above the sea, which is also nearly the level of Nizib, in the vicinity of Port William or Bir on the Euphra-

* Vol. II. p. 206.

tes. But by seeking the passes of the mountains, and especially by diverging to Aleppo, and thence following along the Kowek, very heavy grades would be avoided. According to Chesney, "the bed of the Euphrates at Bir has been ascertained to be 628 feet above the level of the Mediterranean Sea; from which it is distant 140 miles by wagon-road, or 133 miles in a direct line to the mouth of the Orontes; while the Persian Gulf is distant 1,117 miles, — thus giving the trifling fall of rather more on an average than six inches per mile from Bir to the Persian Gulf; supposing the latter to be on the same level with the Mediterranean Sea."*



Section of the Country between the Rivers Orontes and Euphrates.

Bir is a small town of about two thousand inferior houses, situated upon the western bank of the Euphrates, in longitude 38° 6′ east, and latitude 36° 48′ north. The river is here 130 yards broad, and sixteen large passage-boats are kept always ready for caravans, which sometimes number 5,000 camels. From this point small steamers can descend the river to Bassorah, situated in longitude 47° 34′ east, and latitude 30° 32′ north. This city of Omar, founded about the middle of the seventh century, has long been celebrated as a principal depot of the overland commerce between India and Constantinople. The town lies on the western bank of the Shat-el-Arab, — as the Euphrates is called after its junction with the Tigris, — about seventy miles from its mouth, and is accessible for ships of 500 tons burden. Below the city the river is 700 yards broad and 30 feet deep. Here ships from the Indian Seas unload their treasures, to be conveyed by caravans of camels to Aleppo and Iscanderun, and thence reshipped for Constantinople.

From time immemorial the stream of commerce from India to Syria and Turkey has

* Vol. I. p. 47.

flowed through Arabia. To-day the caravans file into the great khan of Damascus, as of old they filed into the gates of Tyre, with the wool and spices of Arabia, and the gold, the precious stones, the silk, and the ivory of India. Both Isaiah and Ezekiel designate ports of Yemen on the Indian Sea, and islands and ports of the Persian Gulf, between which and Phœnicia there was a regular trade by caravans. The nomad tribes of Syria and Arabia "formed these caravans by letting or selling their numerous camels, with their guides and drivers, to the merchants. 'Arabia, and all the princes, or sheikhs, of Kedar were the merchants of thy hand.'"* They furnished dromedaries, and were both carriers and dealers. The direct route lay from the city of Gerra on the eastern shore of the Persian Gulf, across the northern edge of the Arabian Desert to Petra, and thence northward to Tyre; the indirect proceeded southward across the desert to Arabia Felix, and then wound along the coast of the Arabian Gulf to Idumæa. Heeren, after Gesenius, has remarked the geographical accuracy of the Prophet Isaiah in his allusions to the caravan trade of Tyre. "When he threatens Arabia with a foreign invasion, the prophet forgets not to mention the interruption which it would cause to its commerce. 'In the wilderness of Arabia ye will be benighted, O ye caravans of Daden! To the thirsty bring out water, inhabitants of Tema; bring forth bread for the fugitives! for they fly before the sword and before the fury of war.' The trading caravans of Daden, which had hitherto journeyed undisturbed, were to be driven from their usual route by the approach of the enemy, and compelled to pass their nights in the wilderness, where the hospitable tribe of Tema, out of compassion, would bring them water and bread. Tema was situated on the western border of the fertile province of Nejd, by which, therefore, the road passed. From this road the caravans were to be compelled to turn, in order to hide themselves in the desert."† The singular accuracy of the geographical references in the Scriptures is a striking proof of their authenticity.

* Ezek. xxvii. 21. Heeren's Historical Researches, Asia, Vol. I. p. 353.
† Historical Researches, Asia, Vol. I. p. 357.

Every passing allusion to localities is verified by whatever of fact has come down to us from other sources, or by permanent natural and monumental landmarks.

In seeking a direct communication between the Mediterranean and the Persian Gulf by way of Arabia, we have but to follow the established routes of ancient trade. The patient camel has trodden the path before us for thousands of years; and the only question is whether England can lay the iron track of commerce in those same footprints whereon Rome built her granite roads for war. Can the locomotive follow where the camel has led the way? When Colonel Chesney's iron steamer ascended the Tigris to Bagdad, the Arabs, who have a prophecy that when iron shall swim their dominion shall end, came hundreds of miles to see the miracle; and a venerable sheikh, bowing his head between his knees, exclaimed, "Has God made but one such creation?" The question whether iron shall run in Arabian deserts as well as swim in Arabian waters, is really a question of dominion. When the locomotive shall outstrip the fleetest courser on his native sands, the Mussulman may well bow with resignation to his fate.

That a railroad from the Mediterranean to the valley of the Mesopotamian rivers *can* be built, is already demonstrated from actual survey. There are no grades which cannot easily be overcome by skilful engineering. Whether such a road *will* be built, is a simple question of pounds sterling; for neither the character of the Arabs, if rightly managed, nor the power or policy of the decaying governments that retain a feeble sway over these regions, would interpose any serious obstacle. Indeed, both the people and the governments might be enlisted in the work as the behest of Allah, and would readily compromise their Mussulman pride for Christian piastres.

The gigantic scheme of a continuous railroad from Aleppo to Grane on the Persian Gulf, a distance of 850 miles, will at first sight commend itself to Americans who are familiar with Pacific railroad projects, and who look instinctively for the shortest passage. But the cost of such a road is truly appalling. Not less than forty millions of dollars would be required to build a single track. The cheapness of labor would be

nearly counterbalanced by the cost of transporting the materials of the road to a point so remote from forests, factories, and quarries. There would be no grants of land or city loans to aid in its construction; and though it would pass partly through a region naturally fertile, there are few cities along the route to feed it with local traffic. After leaving Aleppo, no prominent points in the interior would be touched by the road; but it must be supported mainly by "through" travel and transportation, and must create for itself a local business in a country where railroads are as yet unknown. This must be the work of time. Colonel Chesney suggests an argument for an Arabian railway which, though it savors of "fillibustering," is quite as taking with Englishmen as with Americans. The Mesopotamian valley, he says, "opens a vast field for agricultural and commercial enterprise, with the safe and productive investment of capital. Besides the advantages of a postal communication with India, a ready intercourse with Southern Persia, Arabia, Mesopotamia, and Kurdistan must greatly extend the outlets for manufactures, and would afford, at the same time, desirable localities for *colonization*." These are the very arguments of Walker for the invasion of Central America.

The route of the Syrian Desert railroad would afford fewer of these advantages than the through route which Colonel Chesney proposes by the ultimate extension of his road from Bir to Bassorah. It would, however, avoid the tedious and uncertain navigation of the Euphrates, and would require only two transshipments of goods. The harbor of Grane is superior to that of Bassorah. "The entrance, which is on the eastern side, is in a great degree sheltered by the island of Pheleche, and the port extends westward several miles before it becomes too shallow for large vessels; its width from south to north, opposite the town, extends nearly seven miles before the water is less than three fathoms deep. Grane is forty-three miles southwest of the bar of the Euphrates."* But this desert route has never even been explored, and we know almost nothing of the country and its levels. A scientific commis-

* Chesney, Vol. I. p. 650.

sion has been appointed in England to survey it, and we may safely postpone the question of the Great Syrian road until we shall have received their report. It is safe, however, to predict, that, although such a road would be of immense benefit to commerce, its stock would be a favorite stock with the "bears," — one whose holders might as well expect returns from "Nicaragua," "New York and New Haven," or "Vermont Central."

Mr. Layard's project for a road from the Mediterranean through Aleppo to Mosul, and thence down the eastern bank of the Tigris, through Bagdad, to the Persian Gulf, carries us through a richer country, and touches more points of commerce on the route; and this might be completed in sections, — that from Seleucia to Mosul being first built, and the Tigris navigated by steam until the river-road could be made. But Colonel Chesney computes the cost of a single track from Antioch to Jabor on the Euphrates, and thence down the right bank of the river to its estuary, at about £6,000,000; and Mr. Layard's scheme could not cost less. We fear, therefore, that it will be long before the distinguished "member for Nineveh" can transport the entire ruins of that capital to the British Museum by steam, without the risk of loss through the foundering or the scuttling of rafts upon the Tigris. However, the British Lion and the Assyrian Bull may yet eat straw together upon the plains of Mesopotamia.

Even more hopeless is the project of Mr. Ainsworth for a railroad through Asia Minor, to cross the neck of the Bosporus from Stamboul to Scutari by a floating viaduct, thence to follow the coast of the Sea of Marmora to a line with Siraze, then in an easterly direction to that town, in the centre of Asia Minor, on the new commercial road from the Black Sea, and thence through Persia to India. This would give a continuous line of railroad from London to Bombay, of 5,500 miles. For 2,600 miles this road is already built in Europe. For the Asiatic portion, Mr. Ainsworth asks only the modest capital of £22,000,000!

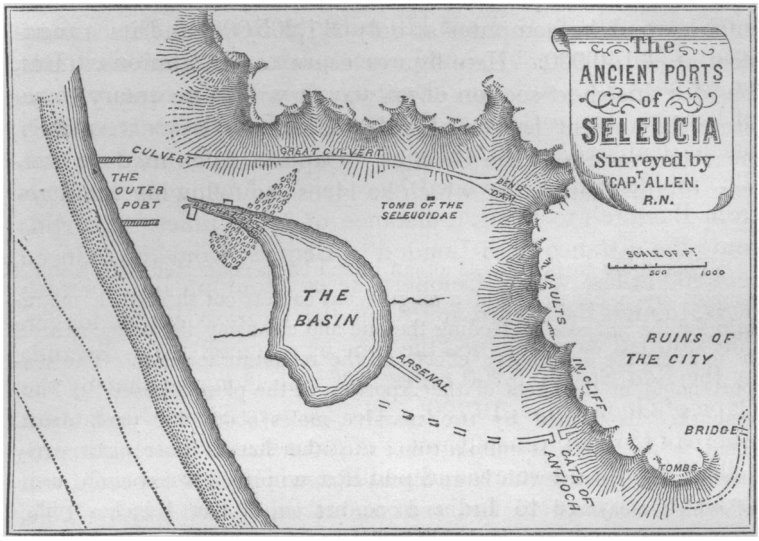
Thus the one item of expense seems to shut us up for the present to the project of Colonel Chesney; namely, a railroad of less than 150 miles from Antioch to the Euphrates, and a

line of steamers upon that ancient river. The construction of such a road he computes at only £1,205,000, and its annual cost at £140,000. Here figures cease to be fabulous. But, besides this short section of railway, it will be necessary to restore the ancient harbor of Seleucia, in the Bay of Antioch, near the mouth of the Orontes. Captain Allen made a survey of this harbor, of which he gives the following lucid report.

"This noble work consists of an inland basin connected with a small seaport by a canal, and of a magnificent culvert cut through a mountain for the purpose of feeding the one and cleansing the other, as well as to avert the destructive effects of the mountain torrents. The seaport noted in the Acts of the Apostles, as the place whence St. Paul embarked, is formed by two massive moles about 200 yards apart. That to the north is quite a ruin; the other has its inner part nearly perfect, constructed with large blocks of stone placed transversely, some of which measured 25 feet, and one, broken, 29 feet 4 inches. This port, though small, was probably sufficient for the reception of ships preparatory to their entering the basin, and for the purpose of refuge in bad weather.

"The inner harbor or basin was probably an excavation with a strong wall fronting the sea. It is *retort-shaped*, communicating with the seaport by the neck part, a canal about 1,000 feet in length, and was possibly at a higher level than the sea, and entered by locks, as Colonel Chesney saw the remains of hinges of gates. The basin is about 700 yards long, by 450 wide. It is now a swamp, through which a little stream passes to the sea by a gap in the wall. The great culvert is nearly 1,200 yards long, terminating near the seaport. Its commencement is at the turning of a little valley, across which an enormous wall was built for the purpose of directing the torrent towards it. This wall has a great portion of it still standing; the dilapidated part being in the middle, where probably there were sluice-gates to feed the basin. The culvert is for the greater part an open cutting, in one place not less than 150 feet deep in the solid rock. There are two tunnels of 21 feet aperture, with a channel for the water in the middle; which arrangement was doubtless made to facilitate the removal of fragments of rock that might have been carried thither by torrents. There is also a conduit at the side to supply the marine suburb of the city with water."*

* Vol. II. p. 210. See also in Chesney, Vol. I. p. 429.



Both Colonel Chesney and Captain Allen, by independent calculations, estimate the cost of entirely clearing the inner harbor by manual labor at about £30,000; but Captain Allen thinks that, by making use of the appliances left by the ancients to aid in the operations of nature, both the expense and labor would be greatly reduced. Enough remains of the work of Seleucus Nicator to justify the belief that its restoration could be accomplished without much labor or cost.

Such a harbor as this would be indispensable to the success of Colonel Chesney's project. Indeed, any Syrian or Mesopotamian railroad would require a good harbor at its terminus on the Mediterranean. At first, however, Colonel Chesney proposes to open his route by using temporarily the harbor of Iskanderun, or Alexandretta, on the Gulf of Iskanderun, which sets up into the sharp angle where Syria and Asia Minor join at the Bay of Issus. This is merely an open roadstead, and passengers and goods must be landed in small boats or lighters. Moreover, the coast is so infested with malaria from the adjacent marshes, that this could never become the permanent port for European commerce. Colonel Chesney proposes, however, to use the railway to Trieste and

the Austrian steamers to Iskanderun, where they now touch. From Iskanderun it is but 110 miles to Beles on the Euphrates. This journey he would accomplish by means of camels, or, as between Cairo and Suez, by vans, with frequent relays of horses. From Beles to Bassorah small steamers would ply on the Euphrates. Bitumen is abundant and cheap for fuel. The rapids can be ascended by steam, allowing sixteen days from Bassorah to Beles, a distance of 1,030 miles. By this route the distance from London to Bombay would be reduced to 4,800 miles, which Colonel Chesney computes at nineteen days, though the return route up the river would be longer. The railroad would reduce the time by one day. The distance by the Red Sea is 5,200 miles, 420 miles longer; that by the Cape of Good Hope, 10,790. The Eastern Steam Navigation Company are building steamers of great size and strength, propelled by both the screw and paddles, which it is expected will make the voyage to India in about thirty-two days. This, however, is problematical. The relative speed of such gigantic steamers has not been fairly tested. Their rates of freight must of course be higher than those of sailing-vessels, since their relative capacity will be less, while their first cost and their expenses out of port will be far greater. In the transportation of passengers and mails, they could not compete in time or in convenience with the route by the Euphrates; and therefore they may be left out of the account in estimating the feasibility of that route. But, on the other hand, the business of the Euphrates line would be almost exclusively the carrying of passengers and the mails. Three transshipments, namely, from the steamer to the railroad at Seleucia, from the cars to the small river-steamers at Bir, and from these again to the gulf-steamers at Bassorah, would be an additional tax, even upon goods whose bulk is in the smallest proportion to their value. The rates of freight also, upon a route combining so many agencies, and requiring such frequent changes, must be far too high for the ordinary demands of commerce. Besides, what freight could be carried by steamers measuring only 130 feet by 20, and of 25 horse power?

The question then arises, What advantage would this pro-

posed route offer above the present overland route by Suez? None at all, in respect either of time or of expense. The small difference of 420 miles in favor of the Euphrates route would be counterbalanced by the greater number of changes and the delays incident to the navigation of the river. But in a political point of view a second line of communication with the Indies is of immense importance to Great Britain. Egypt lies too near Algeria, too near the feet of France, to be the main dependence of English trade and travel to the East. In the event of a war with France, the overland communication of England with India might be entirely cut off. Had Russia gained possession of Constantinople, the Eastern trade of England by that route would have been at the mercy of two powerful and jealous rivals. It is indispensable to the commercial ascendency of England in the East, and even to the preservation of her Indian colonies, that she should open another route to India more immediately under her own control. In the event of war with France, her mails would be brought to Aleppo, and thence by Austrian steamers to Trieste, or up the Danube, while Egypt might be impracticable. Hence the importance to England of a good understanding with Turkey and Persia. Hence, also, the incessant intrigues of Russia to undermine English influence with those governments. Russia herself has a project for a railroad from Bushire on the Persian Gulf, over mountains and morasses, to Astrabad, at the head of the Caspian Sea. The war in the Crimea was quite as much a struggle for India as for Turkey, and there may be truth in the surmise that France, having gained enough of glory in the assault of Sevastopol, was not unwilling that the glory of England should be tarnished by the fall of Kars. For these reasons, we think it highly probable that a railroad will eventually be opened from the Mediterranean to the Euphrates. The steam-fleets of Victoria will crowd the waters where the golden barge of Cleopatra, with its silken sails, wooed Antony to the soft dalliances of love; the puff of the locomotive will disturb the shades of Daphne, and waken the echoes of Taurus and Libanus; and the iron bands of Manchester will girdle the fallen empire of Semiramis.

The second route proposed for Indian commerce, as we proceed southward on the map, may be introduced by an episode of personal recollections.

In the spring of 1853, it happened to us to be detained ten days at Akaba,* awaiting the pleasure of the redoubtable Sheikh Hussein for an escort to Petra. By a convention of the various tribes of Arabia Petræa, each tribe has the exclusive right of convoy for travellers within its own district, unless a lack of camels and other necessaries for the escort should compel the assistance of a neighboring tribe. The *Tor* Arabs, by far the most tractable of the sons of the desert, may conduct travellers from Cairo *via* Suez to Mount Sinai, and thence to Akaba, or to any point on a line with Akaba and Suez, — as, for example, to the small military post of Nukhl in mid-desert; or from Akaba may escort them directly to Suez and Cairo. But to visit Petra, one must put himself at Akaba under the escort of the *Alouin*, the most fierce and extortionate of the *Bedouin* Arabs. Or if one would pass from Akaba *via* Nukhl, or from Sinai directly to Gaza or Hebron, he must contract in mid-desert with yet another tribe, the *Teéaha*, having jurisdiction from the great Hadj route northward to the confines of Palestine.

A few days before our arrival at Akaba, the sheikh of the *Alouin* had set out for Mecca to escort a son of the Pacha of Egypt upon his pilgrimage to the tomb of the Prophet. A messenger, whom we despatched upon a fleet dromedary, overtook the caravan, and brought back word that in ten days the sheikh would return and escort us to Petra; and so, dismissing our faithful *Tors*, we pitched our tents under the palm-grove that skirts the head of the Ælanitic Gulf. For twelve days we had measured the march of the sun across the bald peaks and arid wastes of Idumæa, before the wild monarch of those regions deigned to give us an audience. Then, appearing in his costliest silks, armed with huge horse-pistols and a spear twelve feet in length, the withered, sinewy, sharp-eyed Hussein, the old wizard of the desert, haughtily announced to us that he could not be responsible for our safe-

* "The Pass," or "Defile."

conduct either to Petra or to Hebron, on account of border frays, — a fact of which he was perfectly aware when he sent us his first promise, — but offered to convey us to Nukhl for about twice as much as our dismissed *Tors* would have charged, and at the same time demanded an enormous *backshish* for the time he had consumed in coming to meet us! It was vain to fret at such imposition, or to grieve at turning our backs upon the city of the clefts; to hurry away from Akaba was our only resource.

Yet, bating our chagrin at being outwitted by a scrawny old Arab, those twelve days on the Ælanitic Gulf were days of pleasure and profit. The place of our encampment, indeed, had no attractions but those of natural scenery and of historical associations. At the head of the gulf is a little collection of rude and dirty hovels grouped about a stone fort, which, since the days of Mohammed Ali, has been occupied by the government of Egypt as a symbol of its authority over the Bedouins. A company of Mississippi volunteers or Kentucky rangers, with a single piece of artillery, could storm this fort in half an hour; but it suffices for the protection of caravans and the preservation of order in these desert regions. A row of palm-trees skirts the semicircular head of the gulf, for about two miles;* and gardens of onions, cucumbers, and like products of a light, sandy soil, present a cheering aspect to eyes wearied with the nakedness of the desert. The mountains of Idumæa sweep boldly down from the north almost to the head of the gulf, whence they defile along its eastern shore in broken summits, some of which rise almost perpendicularly two thousand feet, and, shelving over the sea, break the coast into a succession of promontories and ravines. The western coast is lined with the mountains of Et Tih and of the Sinai group, alternating with wadys that give passage to torrents and afford shelter for flocks. The Gulf of Akaba, the ancient *Sinus Ælanites*, is about a hundred miles long, with an average breadth of thirteen miles. It abounds in coral reefs † and bold, rocky promontories; and for want of

* This is supposed to be the site of *Elath*, — "the place of trees," or "the Palm-trees," at the head of the gulf.

† These submarine forests of red coral are supposed to have given to this sea the

harbors, its navigation is far more difficult and hazardous for sailing-vessels of modern build than it was for the small craft of ancient commerce. These could make a harbor behind reefs upon which a modern ship would be dashed in pieces. The neck of this gulf, or its outlet into the Red Sea, is narrow, and when it is safely passed, a ship must often beat all the way up to Akaba against the wind that sucks down through the Ghor. Yet through this narrow fork of the Red Sea was borne no small part of the commerce of India with Tyre in the days of Solomon. David having extended his conquests to the Ælanitic Gulf, Solomon built the two ports of *Elath* and *Eziongeber* near its head. From these ports, says Milman, "a fleet manned by Tyrians sailed for Ophir, their East Indies, as Tarshish was their West. . . . . The whole maritime commerce, with Eastern Asia, the southern shores of the Arabian peninsula, the coasts of the Persian Gulf, and without doubt some parts of India, entered the Red Sea, and was brought to Elath and Eziongeber." A single voyage yielded 450 talents of gold (computed at $17,000,000), and silver was in Jerusalem as stones, and cedar-trees as sycamores. Jehoshaphat afterwards lost his fleet in this same gulf. "His ships were broken, that they were not able to go to Tarshish"; and with him perished the navy and the commerce of the Jews. Under Joram, the Edomites finally regained their independence. By the growth of ports on the Arabian Gulf, the harbors of the Ælanitic Gulf fell into disuse.* But so late as the twelfth century, the Crusaders seized Elath, which was wrested from them again by Saladin, who transported his ships from Cairo on camels.

Often in our daily walks near the ruins of these ancient ports would we pause and look wistfully up the Ghor that stretches from Akaba to the Dead Sea, longing to explore this mysterious rift in company with a competent geologist

name "Sea of Weeds" among the Hebrews, and the later name of Red Sea. "Rubrum mare et totus orientis oceanus refertus est sylvis." — Pliny, XIII. 25.

* "The two gulfs seem, like Castor and Pollux, to have risen and set alternately. Now there is not a single boat upon Akaba from end to end. Once a year, and once only, boats come round from Suez to Akaba with provisions for the Mecca pilgrims; at all other times it is desolate as the wilderness." — Stanley, Sinai and Palestine, p. 83.

and engineer, and to settle the question whether the Jordan did ever find by this channel its outlet to the sea. Often did we see in fancy the fleets of Solomon returning from Ophir with treasures of gold and jewels, of natural history and of art, while the caravans waited where we stood, to bear the rich freight to Jerusalem. Often did we speculate upon the fall of Egypt, of Idumæa, of Judæa, and the decline of Arabia in commerce, and wonder whether the nations that India now enriches would one day be buried in oblivion. But we did not dream that a bold adventurer was even then at work upon a gigantic scheme, that should solve at once all questions of geology and of empire by emptying the Gulf of Akaba into the Dead Sea, and both into the Mediterranean, to make a highway for her Majesty's fleets from India to England. Yet such a projector is found in Captain William Allen of the British navy. This gentleman, having visited the Jordan and the Dead Sea, thus describes the impression made upon him by the peculiar configuration of that region.

"It immediately flashed across my mind, that Providence has here almost furnished industrious nations, at a time when growing intercourse is seeking for improved channels of communication, with the means of constructing a noble canal between the two seas which contain the storehouses of the elements of produce and skill, which it is so desirable should be brought nearer together.

"Nature has, in fact, performed for us the greater part of the work, in a stupendous cutting of some two hundred miles in length, and separated from a sea at either end by a barrier apparently slight; at the north, namely, the alluvial plain of Esdraëlon, already deeply furrowed by the brook Kishon, which might be cut through at very little expense, the required length of the cutting being about twenty-five miles only.

"At the other end, if the hypothesis of the 'dried-up strait' should prove to be correct, the distance for the required canal would not be greater, and the depth of the cutting *may* be small. This, however, is mere conjecture. The truth can be ascertained only by a careful survey of the localities.

"If they should be found practicable, the operation might be very much facilitated by making use of the immense weight and force of back-water of the two oceans; if not as a cutting power, at all events to carry into the abyss or depression the earth, &c. which could be

loosened by the liberal use of gunpowder, saving thereby nearly the whole trouble of digging and carrying away.

"Communication being thus established by canals sufficiently broad and deep, the rushing in of the two seas would restore the *now* Dead Sea to its ancient level, and convert it into the active channel of intercourse between Europe and Asia; the whole bulky commerce of which might then pass through this canal, instead of taking the circuitous route of the Cape of Good Hope, shortening the voyage between England and India to the time in which it is performed by the overland route. The canal route is indeed a little longer; but they would be equalized by the time taken by the transit through Egypt."

Captain Allen conjectures that the Wady Arabah is a "dried-up strait," having originally "joined the basin of the Dead Sea with that of the Gulf of Akaba"; and that coral reefs, such as now line the Gulf of Akaba, here accumulated sand-drifts from the adjacent desert, and finally choked up the strait. This conjecture brings us upon the disputed ground of the geological structure of the lower Ghor. The water-shed of the Arabah is conjectured to be about midway between Akaba and the basin of the Dead Sea. The summit level is placed by imperfect measurement at about 600 feet above the level of the Gulf of Akaba; and by carrying this line of level to the bed of the upper Jordan, it will be seen at a glance that that river could hardly have had its outlet by this channel.* The lower portion of the Ghor is lined with granitic rocks like the Sinaic group; and above these are the calcareous rocks of Idumæa and Et Tih. It would be necessary, therefore, to cut through a bed of rock and sand at some points 600 feet in thickness. Captain Allen counts largely upon the back-water of the oceans to remove this mass of material, when loosened by gunpowder. But the rushing stream would force for itself an irregular channel, disfigured by rocks and sand-banks; and the only safe course would be to remove by manual labor and machinery the entire mass of obstruction from the bed of the canal. For this labor for 80

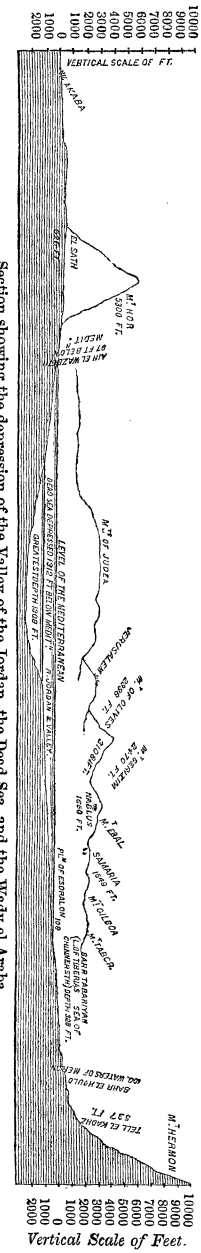
* The level of the Gulf of Akaba is thirty-five feet above the Mediterranean. The latest theory is, that "the whole valley, from the base of Hermon to the Red Sea, was once an arm of the Indian Ocean, which has gradually subsided, leaving the three lakes in its bed, with their connecting river." — Sinai and Palestine, p. 285.

miles, at a mean depth of at least 100 feet by 100 feet in width, the enthusiastic projector has given no estimates. He relies mainly upon what nature has done to furnish the walls of his canal. "The valley of the Ghor is a vast longitudinal crevasse in calcareous and volcanic rocks, extending from the southern roots of Libanus and Anti-Libanus to the Gulf of Akaba, from 1,000 to 2,000 feet deep, and from one to eight miles broad."* This great depression "is bordered on either side by mountain ranges several hundred feet above the level of the ocean. Those on the west are continuous from Mount Hermon through the Belka and Shera ranges to the shores of the Red Sea. On the west, commencing also by a spur from the same Mount Hermon or Anti-Lebanon, there are the mountains of Gilboa, those of Judæa, and the high land of the Desert of Tyh. This wall of mountains reaches also to the shores of the Gulf of Akaba and the Red Sea, by the Sinaic range. In this whole extent there is but one break, which is found between the lesser Hermon and Mount Gilboa; namely, the celebrated plain of Esdraëlon. In crossing this, I ascertained, approximately, its elevation above the level of the Mediterranean to be only about 120 feet by the aneroid barometer."†

Using the bed of the brook Kishon, Captain Allen proposes to cut a canal from Acre to the Jordan, crossing the plain of Esdraëlon by the old Ishmaelitish route and the battle-field of Saul, between the lesser Hermon and Gilboa; thus halving Palestine by an inland sea, and submerging the ruins of Ahab's capital at Jezreel. Here again he relies upon the back-water from the ocean to deepen the rocky channel of the Kishon, and to furrow a canal nearly forty miles in length, a hundred feet in width, and in some parts two hundred feet in depth. This accomplished, the canal would enter the Jordan at right angles at Bethshan, the rising flood would cover the rapids and sinuosities of that stream, and bring it to the level of the Mediterranean; while the water of the Gulf of Akaba, pouring into the Dead Sea from the excavated Ghor, would raise that to the same level.

* Newbold. † Allen, Vol. I. p. 338.

Captain Allen takes it for granted that the waters of two oceans thus loosed from their bounds would flow in the channel that he has indicated. He makes no account of lateral pressure, of irregularities of surface, or of the evaporation of the Dead Sea, which now counterbalances all the water of the Jordan. It does not follow, indeed, as a late writer argues, that, "if the Dead Sea were increased to five or six times its superficial area, it would require four or five such rivers as the Jordan, in addition to that, to supply the deficiency";* for the evaporation of the Dead Sea is augmented by the configuration of its basin, which forms a caldron for the concentrated rays of the sun. Yet the volume of the proposed canal must be greatly increased to balance the waste by evaporation. There is more reason in the suggestion of the same writer as to the volume of water requisite to bring up the level of the Dead Sea. "If a passage were only opened of say 100 feet in width by 30 in depth below the level of the sea, the water that would pass through would not fill up the basin of the Dead Sea in 100 or indeed 1,000 years. Assuming the dimensions and depths above given, we may calculate the number of cubic yards of water that would be required; and taking the discharge of the Mississippi at 30,000 cubic yards a second, and of the Niagara at about half that quantity, it is easy to see that it would take the first-named river about two and a half years, the last-named five years, to bring up the Dead Sea to the level of the other seas."



Section showing the depression of the Valley of the Jordan, the Dead Sea, and the Wady el Araba.

* Edinburgh Review, No. CCIX. p. 126.

We have not taken pains to verify these startling conclusions; for the other objections which we have to present are sufficient to condemn the project.

It is idle to rely upon the natural configuration of the region to furnish the walls of the canal. There is no regularity of surface. The result of this would probably be, that, instead of a smooth canal of uniform dimensions, we should have "a river" flowing through this great inland sea, with its own current, at its own will.

As yet we have no practical data by which to judge of Captain Allen's scheme. No part of the route has been thoroughly surveyed, and no estimate is given, not even a conjecture of the cost of the work. Indeed, the project does not offer to capitalists a sufficient inducement to incur the cost of a survey; for even if the canal could be opened according to Captain Allen's theory, it would give us only an elongation of the Gulf of Akaba, totally unfit for navigation by sailing-vessels. Captain Allen makes it a principal feature of his scheme, that harbors could be so easily constructed at the termini of the canal in the two seas. At Acre, five fathoms of water are found at a distance of six hundred yards from the shore; and the same depth is reached at half a mile from the head of the Gulf of Akaba. But "the storm-wind Euroclydon" would still sweep down the long gully from the north. We have seen what perils have always encompassed the navigation of this arm of the Red Sea. It is said that, in crossing the neck of the Gulf of Akaba, "the Arabs always offer up a prayer for their safety." But if only steamers or vessels assisted by steam-tugs could navigate this canal, it is obvious that its revenues would never pay the interest upon the cost of construction. The gain to commerce would be small, and the advantage to travel absolutely nothing.

It is amusing to notice with what facility Captain Allen sweeps away the political, social, economical, and religious objections to his scheme; and how thoroughly English he is in his conception of the design of the Creator in the structure of the Asiatic continent as a market for Manchester goods. This self-sufficiency of our Transatlantic brethren upon the soil of the East, is a fair counterpoise to our own "manifest destiny" toward the South and West.

"The execution of a project so vast," observes Captain Allen, "could not of course be carried on without some sacrifices; but these will be trifling when compared with the magnitude of the advantages to be derived in exchange. For instance, a large portion, some 2,000 square miles, of the territories belonging to our faithful and gallant ally, his Highness the Sultan, will be submerged; together with a city of perhaps some thousands of inhabitants, and some Arab villages. But the territory is useless, being for the most part incapable of cultivation, especially the Southern Ghor or Wady Arabah. The Northern Ghor, or valley of the Jordan, has some fertility, of which but little advantage is taken by the wandering tribes of Arabs, who capriciously cultivate small portions of it here and there. The city of Tiberias is a filthy heap of ruined buildings, hemmed in between the lake and steep barren mountains, from which a forced removal to a fertile and adjacent neighborhood would be a blessing to the debased, apathetic, and wretched inhabitants. The villages consist of mud-huts, temporary by their nature, or of tents which are intentionally so. From all these the occupants derive little advantage, and his Highness less revenue. Their condition, besides, might be immensely improved by the activity and trade which would be stimulated through the navigation of the canal by ships of all nations; and the Sultan would draw great revenues by transit dues where he now receives nothing; and as remuneration for the loss of this unprofitable territory, some of the finest countries of the world, the early seats of population — namely, those of the Rephaim, the Zuzim, and the Emim, the trans-Jordanic provinces, so judiciously chosen by some tribes of the Jews — would be rendered easy of access by the proposed canal."

The Captain ignores the fact that the plain of Esdraëlon is the richest portion of Palestine, and that the regions of Tiberias and of Jericho * were once, and might again become, a fertile garden. The political influence of his improvement he proposes to guard by placing his canal under the joint protection of England, France, and Turkey; as if he would cement the alliance of these powers by washing out the memory of the battle of Mount Tabor and of the siege of Acre.

The religious prejudices of Jews, Christians, and Moham-

* Josephus says of the plain of Jericho: "There is scarcely a clime to be found throughout the habitable globe comparable to this, so manifold are the returns from the seed sown, — a circumstance attributable, in my opinion, to the warmth of the air, and to the fertilizing properties of the water." De Bello Judaico, IV. 3.

medans he disposes of in the same summary manner. Of the first he remarks: —

"The Jews would possibly object strongly to the loss of Tiberias, which is one of the four holy cities; but they are strangers from Russia, Poland, &c., who have no property in it, and come there in the hope of seeing the Messiah rise out of the lake, which is a general expectation among them, though on what authority it is not known. I sketched one old man, who was anxiously watching on the shore when the spray was dashing up, in the evident hope of seeing Him rise. If such is really the general belief of the Jews, they must consider it as a miracle, and of course it could not be impeded by a few fathoms more or less in the depth of the sea; consequently, they cannot urge any valid objection to this result, though they may not like to see the filthy city which they hold to be sacred submerged and lost for ever."

Possibly the Jews might even regard the Captain as their Messiah, — according to the prediction of Zechariah, that in his day "living waters shall go out from Jerusalem, half of them toward the former sea, and half of them toward the hinder sea," — an interpretation which we suggest to literalists. The prejudices of Christian pilgrims the Captain proposes to subdue by a line of steamers from Jerusalem to the pure sources of the Jordan; and those of Mohammedans, by steamers to Medina. For ourselves we believe that the hallowed associations of Palestine will remain for ever undisturbed; that Tabor and Carmel, Hermon and Gilboa, the river Kishon and the Lake of Galilee, will witness to all coming ages the most memorable events in the religious history of man, and that till the end of time the Dead Sea will bear its silent but awful testimony to the retributive justice of God.

The third route proposed for the commerce of Europe with the Indies is by a ship-canal connecting the waters of the Mediterranean with those of the Red Sea at Suez. This project is given with much detail in the *exposé* of M. Ferd. de Lesseps, published in the *Nouvelles Annales des Voyages* for September, 1855. Acting under a firman from Mohammed-Saïd, the present viceroy of Egypt, M. de Lesseps undertook the exploration of the Isthmus of Suez, assisted by the French engineers Linant Bey and Mougel Bey,

who have constructed the most important hydraulic works of Modern Egypt. The exploration was made during the months of December and January, 1854–55, and the report was submitted to the government of Egypt in the following March.

Two routes were proposed to the engineers for their examination, — the one a direct route from Suez to the ancient embouchure of the Nile in the Pelusian Gulf; the other a circuitous route, crossing the Nile and terminating at Alexandria. The latter route is recommended by M. M. Talabot, the engineer who represented France in the international commission appointed in 1847 to explore the Isthmus of Suez.* The canal would leave the Red Sea at a point a few miles below Suez, where a harbor could easily be constructed, then, striking the line of the ancient canal from the Red Sea to the Nile, it would cross that river a few miles below Cairo, and thence be carried close upon the line of cultivation to the harbor of Alexandria. The Nile would be crossed by an aqueduct having four locks at each end, each lock 330 feet long by 70 wide and 30 in depth, to be supplied by steam-power with water from the river.

The alleged advantages of this route over the direct route to Pelusium are, that for 135 miles it would follow the bed of the old canal, and that it would have, for little cost, a good harbor both on the Red Sea and at Alexandria on the Mediterranean. It is advocated with great earnestness by M. Talabot in the *Revue des Deux Mondes.*†

But the objections to this route, as set forth by M. de Lesseps, and in an article of the *Moniteur* (Juillet 6, 1855), seem to us insurmountable. A summary of those objections only can be presented here. The length of the indirect route (256 miles) would be nearly three times that of the direct, and its cost in the same proportion. By this route the canal must cross the Nile at some point below the barrage, where the river at its maximum measures upwards of 6,000 feet in breadth. But the channel of the Nile, even at the maximum of the rise in

* This commission was composed of Messrs. Stephenson for England, Talabot for France, and Negrelli for Austria.

† Mars et Mai, 1855.

the river, is never more than fifteen feet in depth; whereas a ship canal would require a depth of twenty-six feet. If the river should be dredged by a transverse channel to the depth of thirty feet, it would be impossible to keep this free from the immense deposits of alluvion brought down from Nubia by the rising Nile. Even if this choking of the channel could be provided against, the difficulty of crossing with sails, and against baffling winds, a current of four miles an hour, would be fatal to such transverse navigation. The stupendous project of crossing the Nile by an aqueduct thirty feet in depth, and raised sixty feet above the low-water level of the river, comports better with the despotic lavishness of human labor in the age of Cheops, than with the practical economy of the nineteenth century after Christ. That may well be postponed till Lepsius shall have identified the mummy of the builder of the pyramids, and extorted his secret from the hieroglyphics of his sepulchre.

The injury of such a canal to the present system of canals for the irrigation of Lower Egypt, the interruption it would cause to the ordinary navigation of the Nile, and the serious changes it would effect in the port of Alexandria, would be conclusive against it, even if the above-named obstacles could be overcome. The Delta is everywhere traversed by artificial canals used for conveying the surplus waters of the inundation to every part of the cultivable land. This network of canals would be seriously damaged by the construction of a ship-canal across their beds, though the whole amount of water pumped up from the river to feed the locks would be returned to it at the opposite extremity of the aqueduct. The multitudes of dahabiehs that now cover the surface of the Nile, laden with produce and merchandise, would be seriously impeded by a ship-channel crossing the bed of the river.

The other or direct route contemplates the opening of a canal from Suez to the ancient Pelusium by way of the lakes Amers and Timsah. The advantages of this route are thus set forth in the memoir of M. de Lesseps: —

"The Isthmus of Suez is a narrow tongue of land, whose two extremes are Pelusium and Suez. It forms for the space of thirty leagues a longitudinal depression, caused by the intersection of two

plains which descend by a gradual slope, the one from Egypt, the other from the first hillocks of Arabia Petræa. Nature seems to have traced in this line a communication between the two seas.

"The geological aspect of the land suggests the idea that the sea once covered the valley of the isthmus. We find there large basins, of which the principal is called the *Amers* lakes, which still bear palpable traces of the action of the waters of the sea. These lakes offer, in the first place, a natural passage already prepared for a canal, and a reservoir of 330,000,000 metres in surface for feeding it.

"Lake Timsah, situated at equal distance from Suez and Pelusium, would become the natural port of the canal, where ships might find everything necessary for supplies and repairs, and, in case of need, a depot for merchandise."

All along this line from Suez to Pelusium the soil is light, and could be easily removed by hand or by dredging machines. The objection that the canal would soon be filled in by sand-drifts, M. de Lesseps rebuts with the statement, that in 1855 the engineers found distinct traces of all the encampments of the engineers who preceded them in 1847; that vegetation in the moist region of Lake Timsah maintains its place; and that the mounds of the old canal of the Caliphs and the Pharaohs, and other remains of antiquity dating back two and three thousand years, still exist upon the surface of the soil. Indeed, we think it altogether likely that the closing of the old canal of Suez was owing to the endless shifting of the government, rather than to the shifting of the sands. The movable "downs" in the vicinity of Lake Timsah are said to change form rather than place, and M. Lesseps argues, from the successful engineering upon similar lands at Bordeaux, that these can be fixed artificially, especially as the sand is uniformly humid at a few feet below the surface.

As regards the entrance to the canal, M. de Lesseps admits that it would be necessary on the Mediterranean side to build into the sea 6,000 metres, or nearly five miles, to find a depth of twenty-five feet. Captain Allen asserts, that, in order to reach five-fathom water, it would be necessary to build out the dykes of the canal five miles into the sea. But the engineers of the Egyptian survey quote as examples the dykes of Cherbourg, 3,768 metres long in fifteen metres of water, the

breakwater at Plymouth, 1,364 metres long in eleven metres of water, the dyke of Delaware, 1,200 metres in fourteen of water, and that of the Bay of the Lion at the Cape of Good Hope, where the breakwater is said to be 8,000 metres in length, with a depth of more than sixteen metres. The existence of this latter work is denied by a writer in the Edinburgh Review.

The objection that an outlet at Pelusium would be liable to deposits of alluvion from the Nile, is met by the engineers with the assertion, that the Egyptian seaboard is not perceptibly affected by earthy matters held in suspension by the waters of the Nile, but is covered solely with marine deposits, and that even these have long since ceased to accumulate on the Pelusian shore. Indeed, the ruins of Pelusium can still be traced where Strabo described the city fifty years before Christ, at twenty stadia from the sea. Wilkinson states that "the remains there consist of mounds, and a few broken columns." The place is now called *Teeneh.*

We cannot but think that M. de Lesseps underrates the effect of the alluvial deposits of the Nile, in his anxiety to make out a case. Herodotus noticed, that, at the distance of one day's sail from Egypt, the lead would bring up mud in eleven fathoms water; and he conjectured that the whole delta was once a bay of the sea, which in the course of ages was filled up by the alluvial deposits of the Nile.* Since the year 1243, the delta of the Nile has advanced a mile at Damietta; and the same at Foah since the fifteenth century. Still it does not now form so rapidly, in consequence of the great accumulation. "The quantity of sediment annually brought down by the Ganges amounts to 6,368,077,440 tons, or sixty times more than the weight of the great pyramid in Egypt. The delta at the mouth of the Mississippi is several hundred miles long, and has advanced several leagues into the Gulf of Mexico since the settlement of New Orleans. It contains two thousand seven hundred and twenty cubic miles of matter." †

The best data concerning the delta of the Nile, as condensed by Sir Charles Lyell, lead to the following conclusions: —

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* Book II. 5 – 12.

† Hitchcock, Geology of the Globe, p. 115.

"In consequence of the gradual rise of the river's bed, the annual flood is constantly spreading over a wider area, and the alluvial soil encroaches on the desert. . . . . For this reason, the alluvial deposit does not cause the delta to protrude rapidly into the sea. It has made small progress in the last 2,000 years. . . . . The most careful analysis of the Nile mud shows a singularly close resemblance in the proportions of the ingredients of silica, alumina, iron, carbon, lime, and magnesia, and those observed in ordinary mica; but a much larger quantity of calcareous matter is sometimes present. . . . . Nothing but the finest and lightest ingredients reach the Mediterranean. . . . . The depth of the Mediterranean is about twelve fathoms at a small distance from the shore of the delta; it afterwards increases gradually to fifty, and then suddenly descends to 380 fathoms, which is, perhaps, the original depth of the sea where it has not been rendered shallower by fluviatile matter." *

An argument for the feasibility of M. de Lesseps's plan is founded upon the fact, that anciently the Isthmus of Suez was pierced by a canal, which after several centuries was closed, partly through neglect and partly from considerations of political expediency. If we may credit Strabo, the great Sesostris, whom Wilkinson and Lepsius suppose to be the same as Ramesses II., built a canal connecting the Nile with the Red Sea. "It commenced about 12 miles to the northeast of the modern town of Belbeys, and after following a direction nearly east for about 33 miles, it turned to the south-southeast, and continued about 63 more in that line to the extremity of the Arabian Gulf." The proof of its great antiquity is thus stated by Wilkinson: "Though filled with sand, its direction is still easily traced, as well from the appearance of its channel, as from the mounds and vestiges of ancient towns upon its banks, in one of which I found a monument bearing the sculptures and name of Ramesses II., — the more satisfactory, as being a strong proof of its having existed at least as early as the reign of that monarch." † Lepsius confirms this view. He says: "This canal was undoubtedly cut by Ramesses (Sesostris), because in the neighboring ruins of Abu Keshêb a granite group has been found which represents this king, and which must have stood in the temple of the place." ‡ In

* Principles of Geology, p. 262.

† Wilkinson, Vol. I. pp. 69, 71.

‡ Egypt, Ethiopia, and Sinai, p. 441.

the seventh century before Christ, that commercial Pharaoh, *Necho*, who kept large fleets upon both the Mediterranean and the Red Sea, and who well-nigh circumnavigated Africa, commenced re-opening this canal, but desisted, says Herodotus, upon a warning from the oracle that he was laboring for the barbarians; that is, would give facility to the invasions of an enemy. Herodotus and Diodorus make this Pharaoh the projector of the canal; but it is evidently of much higher antiquity. "After the time of the Ptolemies and Cæsars," to use the condensed statement of Wilkinson, "it was again neglected, and suffered to go to decay; but on the revival of trade with India, this line of communication from the Red Sea to the Nile was once more proposed, the canal was reopened by the Caliphs, and it continued to be used and kept in repair till the commerce of Alexandria was ruined by the discovery of the passage round the Cape."*

Here, then, is a fact of great importance in any calculations for a canal from Suez to the Mediterranean; namely, a canal more than 100 miles long, more than 100 feet broad,† and 40 in depth, did once exist upon the isthmus. True, this canal connected the Red Sea with the Nile, and therefore gives no clew to the nature of the harbor at Pelusium. But the restored canal of Ptolemy Philadelphus followed the line proposed by M. de Lesseps, from the Gulf of Suez to the Bitter Lakes. This canal was 100 feet wide and 40 deep. That monarch also constructed an artificial sluice, probably at the point where the sea entered, where he also built the town Arsinoë. What has been done may be done. The disuse of this canal was the result, not of natural obstacles, but of the decaying and changing government of Egypt.

So far, then, as the surface of the country is concerned, we believe that the project of M. de Lesseps is feasible. He estimates the cost of the canal, and of the two harbors on the Mediterranean and the Red Sea, at 185,000,000 francs, or $37,000,000. This is no doubt an under-estimate. The Red Sea, once supposed to be 30 feet above the level of the Mediterranean, is now ascertained to have a mean level of only $2\frac{1}{2}$

* Vol. I. p. 71.

† Some say cubits; but Pliny says feet. Vol. VI. 533.

feet above that sea, which is barely sufficient to give a current to a canal 70 miles in length, but would be of no service in the work of excavation. Both labor and life are held so cheap in Egypt, that, wherever native labor would avail, the excavation could be conducted at the minimum of wages. But in blasting, and in building locks, piers, and harbors, European skill and labor would be in requisition. The great cost of the work would be in constructing harbors at Pelusium and Suez.

M. Lesseps estimates the receipts of the canal at 40,000,000 francs, or $8,000,000 per annum; but of this $2,000,000 is to be derived from the produce of lands adjacent to the canal, yet to be reclaimed and fertilized!

The danger to sailing-vessels in navigating the Red Sea, and the frequent delay in beating in and out of the Straits of Gibraltar, will be serious objections to the use of the canal by British East-Indiamen. Travel and the mails are already better accommodated by the railroad from Alexandria to Suez. Yet for large steamers carrying freight this canal would afford immense advantages, and we can hardly doubt that the project will one day be realized, but mainly in the interest of France and Austria. Egypt has been styled the "Holy Land of Commercial Freedom."

Rabbi Benjamin of Tudela thus describes the commerce of Alexandria in 1168:—

"The city is very mercantile, and affords an excellent market to all nations. People from all Christian kingdoms resort to Alexandria, from Valencia, Tuscany, Lombardy, Apulia, Amalfi, Sicilia, Rakovia, Catalonia, Spain, Roussillon, Germany, Saxony, Denmark, England, Flanders, Hainault, Normandy, France, Poitou, Anjou, Burgundy, Mediana, Provence, Genoa, Pisa, Gascony, Arragon, and Navarre. From the west you meet Mohammedans from Andalusia, Algarve, Africa, and Arabia, as well as from the countries towards India, Abyssinia, Nubia, Yemen, Mesopotamia, and Syria, besides Greeks and Turks. From India they import all sorts of spices, which are bought by Christian merchants. The city is full of bustle, and every nation has its own hostelry there." — *Travels*, Bohn, p. 128.

At the close of the last century, Alexandria had declined to the lowest stage of neglect; but the energy of Mohammed

Ali restored it to life, and it has once more become the leading port of the Mediterranean. The opening of the harbor of Pelusium would not materially affect the prosperity of Alexandria. The interior trade of Egypt would always create a considerable activity in her market, while the transit of mails and passengers by the Suez railroad would continue to enliven her streets and to give occupation for her citizens. The canal would be used by powerful steamers, or by East-Indiamen towed by steam.

M. de Lesseps has procured from the government of Egypt a charter for an international company with exclusive rights and privileges for the canalization of the Isthmus of Suez,* and a commission of engineers from France, England, Austria, Prussia, Holland, and Sardinia have gone to Egypt to survey the route. Their report will settle the whole question.†

Meantime, we of the United States may look calmly on, gradually pressing a railroad to the Pacific, multiplying our communications with California, establishing lines of steamers from San Francisco to Canton, and thus monopolizing a trade which no Eastern canal or railroad can divert from our

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* The principal terms of the firman are as follows: —

1. The company to bear the whole expense of the work.

2. The company to pay into the treasury of Egypt fifteen per cent, and to the original stockholders ten per cent, of the net revenue.

3. The Egyptian government to have supervision over its tariff of tolls, &c.

4. Perfect equality to the ships of all nations; exclusive privileges to none.

5. This grant holds for ninety-nine years from the day of opening the canal.

6. All public lands necessary for the canal to be given gratuitously; and all uncultivated public lands which the company shall make fertile by irrigation shall become the property of the company.

The company has also the right to tax all persons using the water of the canal for irrigation, the right to use all necessary materials from the state quarries, and the free entry of all machines and materials of construction.

† The commissioners of the several governments appointed to explore the route recommended by M. de Lesseps have not yet issued a public report. But we are assured from private sources, which we regard as perfectly reliable, that their judgment is so favorable to the plan of M. de Lesseps, that two thirds of the amount of stock has already been subscribed, and the feeding and irrigating canal from the Nile through Goshen will be dug, and the quarries opened, during the present year.

We understand also, that, by turning the mouth of the canal at the Mediterranean *westward*, five-fathom water can be reached with one half the extent of dyke originally contemplated.

grasp. Thus, while the empires of the Old World struggle, now with arms, now with diplomacy, and now with engineering, for ascendency in the East, we of this Western hemisphere, if only we are true to the principles of freedom, of peace, and of religion, shall appropriate to ourselves the wealth of the Indies and the dominion of the seas.

ART. IX. — *Surgical Reports and Miscellaneous Papers on Medical Subjects.* By GEORGE HAYWARD, M. D., President of the Massachusetts Medical Society, Fellow of the American Academy of Arts and Sciences, late Professor of Surgery in Harvard University, and Consulting Surgeon to the Massachusetts General Hospital. Boston: Phillips, Sampson, & Co. 1855. 12mo. pp. 452.

THIS work is the third which has recently been published by retired Professors of the Medical School of Harvard University; and, with those of Doctors Bigelow and Jackson, it furnishes a pleasing opportunity for paying a just tribute to the medical science of Boston. We have been long accustomed to look upon Philadelphia and New York as the centres of medical publication in this country. Boston, noted for her skilful surgeons and physicians, produces comparatively few medical books; Philadelphia and New York, with no better materials, flood the country with their works on medicine and surgery. Boston writes little, but that little is original, practical, and the result of long experience; her sister cities write much, — too much perhaps, — in the form of translations, compilations, manuals, *guides to*, rather than the *results of*, practice.

The work of Dr. Bigelow has been noticed by us in a former number,* as exceedingly valuable and interesting, even to the general reader. Dr. Jackson's "Letters to a Young Physician" affords important aid to the practitioner, in language eminently clear and intelligible. The work of Dr. Hayward is more strictly intended for the profession, and

* April, 1855.